Project Narrative for
Railroad Safety Grants for the Safe Transportation of Energy Products by Rail

Project Title:

Metropolitan Des Moines Mainline Track Improvements

Location:

Iowa Interstate Railroad, Ltd.
Des Moines & West Des Moines
Polk County
Iowa
Track improvements traverse zip codes 50317, 50309 & 50312
Congressional district IA-3

Type of Project:

Track Enhancement

Applicant:

Iowa Department of Transportation
Office of Rail Transportation
800 Lincoln Way
Ames, IA 50010
Primary contact: Tamara Nicholson, Director, Office of Rail Transportation
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Proposed Project

The objective of this project to reduce maintenance risks on an ethanol route by reconstructing 4.34 miles of mainline track in downtown Des Moines and West Des Moines. The reconstruction will include the replacement of existing worn rail with new 115# rail, as well as tie replacement, ballast placement, surfacing and new turnouts.

The end result will be an improved, stronger track structure that will better meet the current and future demands of ethanol traffic. The rehabilitated route, which spans the metropolitan Des Moines area, will reduce the potential for incidents from rail traffic. Improved track conditions will also allow speeds to increase to 25 mph from the current 10 mph, reducing wait times at 19 at-grade crossings, subsequent traffic congestion and emissions.

In recent years, much of downtown Des Moines has been redeveloped in the vicinity of the railroad tracks, and the area has become a significant commercial and high density residential area. Due to this development, the potential severity of a rail incident has increased.

Project benefits at a glance

- Increased safety in the movement of ethanol through a populated area
- Improved quality of life for downtown commuters by reducing traffic congestion from train movement
- Financial benefits from the reduction in time spent waiting for trains at crossings
- Improved quality of life in the vicinity of the track through noise reduction
- Increased safety with more reliable signal systems
- Time reduced by idling vehicles at a total of 19 highway-railroad at-grade crossings
- Environmental benefits from reduced locomotive fuel usage
- Environmental protection of recreational water features

Background

Iowa Interstate Railroad (IAIS) is a regional railroad that runs from Council Bluffs, IA to Chicago and Peoria, IL and is heavily vested in the movement of agricultural products, including ethanol. Appendix A includes a more detailed profile of IAIS.

Figure 1- Iowa Interstate Railroad's Iowa track location

Iowa is the largest production center for ethanol in the U.S. with the capacity to produce 3,820 million gallons annually, approximately 25% of the national production. Though crude oil incidents have captured the spotlight, ethanol represents a very similar risk. Ethanol is highly flammable, easily ignited by heat, sparks or flames. Vapors may form explosive mixtures with air and vapors may travel to the source of ignition and flash back. The primary difference between crude oil and ethanol is that ethanol is less viscous than crude oil and ethanol easily mixes with water. That means that it can't be blocked or removed from a waterway with booms, creating different environmental risks and recovery/mitigation actions. The emergency response guidelines indicate that the same risks and response in terms of life and property apply to both ethanol and crude oil.

The Iowa Department of Transportation (Iowa DOT) submits this application to increase the safety of a primary ethanol route that runs directly through the state's most populous metropolitan area, including the downtown Des Moines area which is undergoing redevelopment and West Des Moines, a rapidly growing suburb.

Applicant eligibility

The Iowa Department of Transportation (Iowa DOT), an eligible applicant, is submitting this application on behalf of the Iowa Interstate Railroad (IAIS), a hauler of energy products in the state. IAIS is a primary route for ethanol produced within the State of Iowa. The Iowa Department of Transportation, if awarded a grant, will execute a cooperative agreement with Iowa Interstate Railroad as the sub-grantee spelling out the terms and responsibilities inherent in administering a federal grant.

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Funding

Amount of Federal funding requested	$2,390,059	80 %
Match amount provided by Iowa Interstate Railroad	$597,515	20 %
Total project cost	$2,987,574	100%

IAIS, a class II railroad operating in Iowa and Illinois, will provide the required 20% match. Federal funds for this particular project location have not previously been sought.

Though this particular project has not received or sought prior federal funding, IAIS is familiar with and has successfully managed previous federal grants. IAIS was the recipient of two grants via the Federal Railroad Administration's (FRA) Railroad Rehabilitation and Repair Grant program. These grants totaling $708,000 and $306,491 and were administered by IAIS through a sub-grantee agreement with the Iowa DOT. The money was used to assist in the repair of damages from severe flooding in the Midwest. IAIS provided the necessary matching 20% to complete the identified repairs.

Project Description

The project will upgrade approximately 4.34 miles of IAIS mainline railroad track in downtown Des Moines and West Des Moines. The project consists of two track segments on this route, which will complete the upgrade of track within the entire metropolitan Des Moines area. The connecting segment of track will be upgraded in 2016 using private funding. This route typically has 6 trains/day with an average train length of 7,500 feet. The speed limit on this section of track is currently limited to 10 mph due to its current class of track.

Upgrades of the track with new rail, ties, ballast, surfacing, and switches will allow for speeds to be increased to 25 mph, while also reducing the potential for derailments caused by rail fractures or rail geometry.

A Statement of Work is included as Appendix C

Below is a schematic of the project area. The portions of track to be reconstructed as part of this project are shown in RED. The track shown in BLUE is similar work that will be completed by IAIS with its own funds in 2016. A larger copy of the following is included as Appendix B.

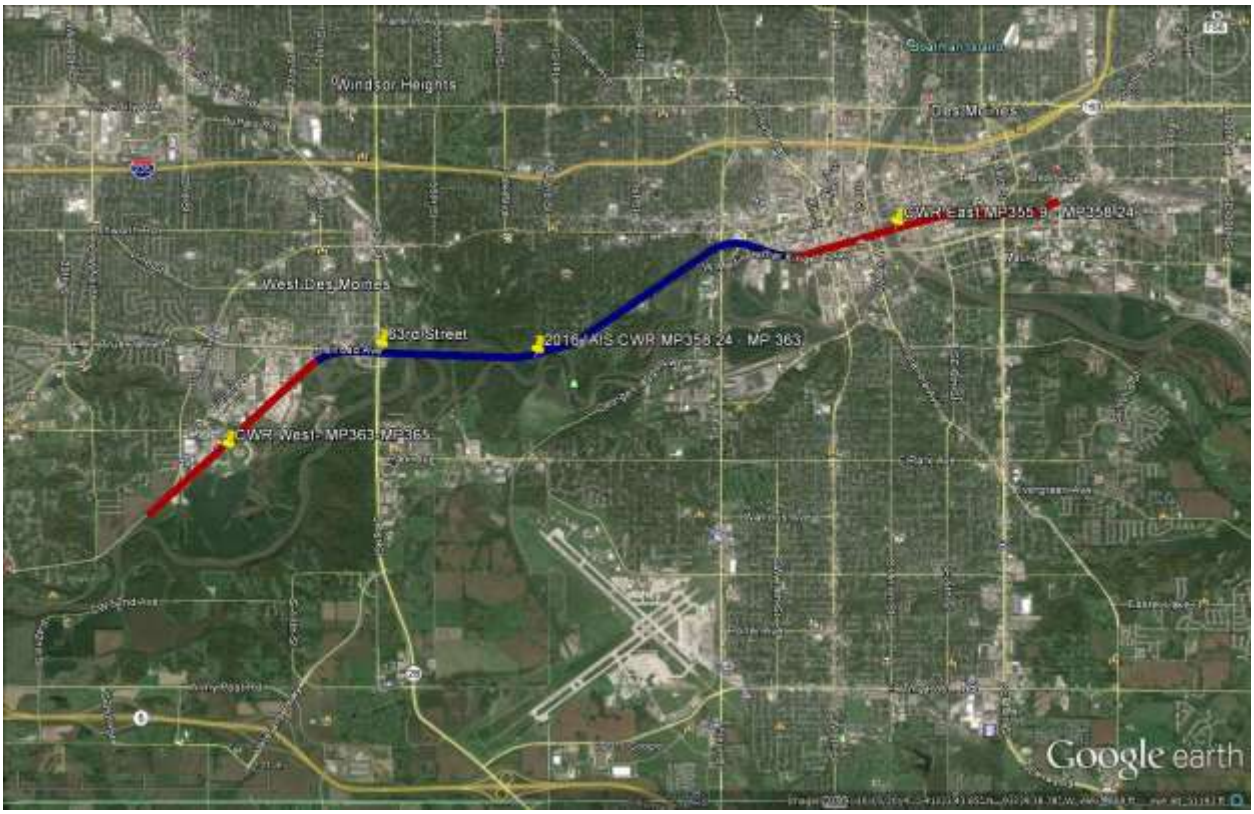
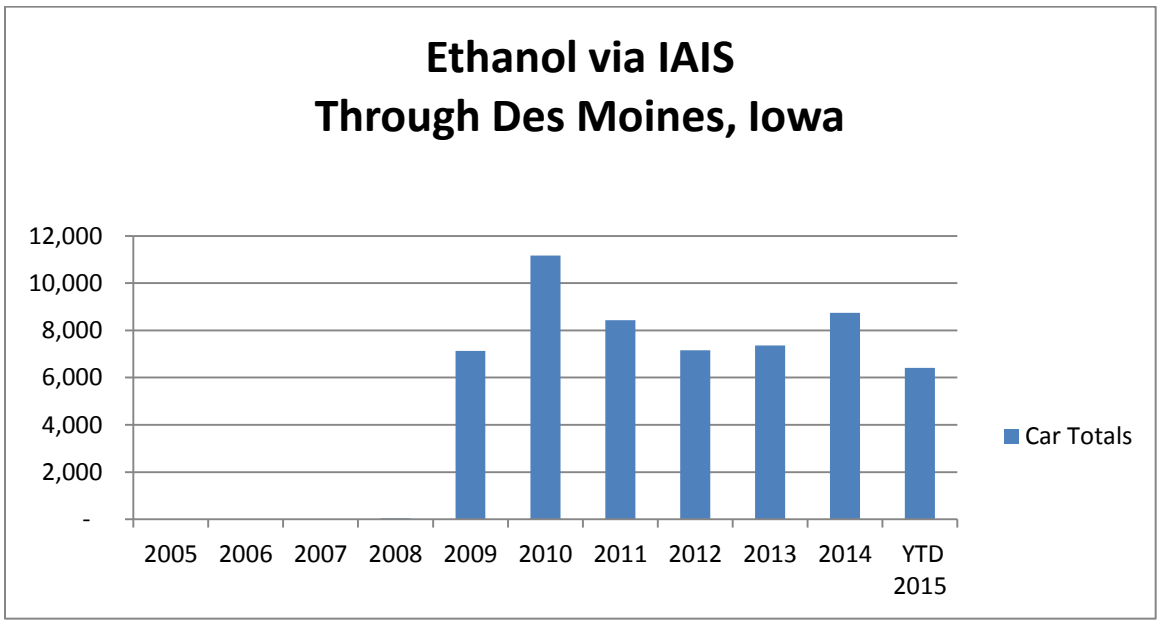


Figure 2-Metropolitan Des Moines Mainline Track location – Red indicates project area.

Energy products

This particular route transports ethanol from four sources in western Iowa, averaging 8,060 rail cars annually from 2009 to the current date. As an energy product, the production of ethanol is highly dependent on commodity prices for energy products and will fluctuate from year to year. Annual amounts of ethanol shipped on this particular route began with minimal shipments in 2008, peaked at over 11,000 rail cars in 2010, and currently has seen 6,400 rail cars in 2015 year to date. Approximately one half of the ethanol that travels on this route is in unit trains.



Safety Risks and Challenges

The current track infrastructure in the project area is primarily 112# jointed rail. This 112# rail section is no longer manufactured. In the 1950's, 115# rail became the standard. The 115# is less prone to head-web separation defects than 112#, and has proven to be a more reliable rail section. This segment of track was originally acquired when the Rock Island Railroad was dissolved through a bankruptcy in the 1980's. When acquired, the route suffered from years of deferred maintenance and was in poor condition. IAIS has made continuous improvements to their line, but segments now are in need of complete rehabilitation to meet modern standards and improve the safe transport of large quantities and unit trains of ethanol.

The proposed 115# rail will be installed as continuous welded rail (CWR). This will eliminate rail joints in this section of track which will significantly reduce maintenance and allow for speeds to be increased from 10 mph to 25 mph. By eliminating rail joints, it also eliminates the need for bonds at each joint necessary for crossing signal circuits. This will also improve the reliability of the signal system through downtown Des Moines. This is a not an insignificant benefit because the downtown Des Moines segment of this project includes 17 actively controlled crossings with either lights or lights and gates.

The project area crosses or is adjacent to waterways, including the Des Moines and Raccoon River and the Raccoon River Park which includes a small lake. An ethanol derailment or spill could impact these waterways, particularly since ethanol dissolves in water and cannot be contained or recaptured using booms.

Figure 3- Track over Des Moines River in downtown Des Moines

An analysis of features within one half mile of the route was conducted. See maps and table included in Appendix D. Significant features or populations that could be at risk or be impacted by an evacuation in the event of an incident involving a release were identified through a GIS analysis:

Approximate population	6109
Approximate housing units	3572
Courthouses, prisons & public safety providers	47
K-12 Schools	2
Childcare centers	6
Hospital facilities	19
Nursing homes	9
City or town facilities	111

Unknown is the number of persons that work within the half mile of the route. The half mile buffer zone encompasses nearly the entire downtown Des Moines area, home of many major corporate headquarters and other commercial entities. No doubt the number of workers present within the buffer zone on a weekday far exceeds the population of the area.

Figure 4 - Photo of downtown Des Moines taken (illegally) from the IAIS Bridge

Other Beneficiaries

Benefits beyond the railroad include those to the traveling public. Traffic congestion through downtown will be reduced and wait times of vehicles cut at seventeen highway-railroad at grade crossings. By increasing speeds from 10 mph to 25 mph, trains can still travel safely yet cut the wait times at crossings by more than half, keeping traffic flowing more freely. Signals will be more reliable with CWR, further increasing safety for the traveling public and reducing any delays from signal malfunctions
The installation of CWR will reduce noise from passing trains for nearby local businesses and residents, as the traditional "clickity-clack" from steel wheels traversing rail joints will be eliminated

Specific Project Activities

The project is a relatively straightforward rehabilitation of the route - new rail, ties, hardware, ballast and surfacing, including the rehabilitation of crossings in need of repair and replacement of a turnout. Under a sub-grantee agreement, implementation will be a joint effort between IAIS and contractor labor. It is expected that IAIS labor will be involved in the unloading of the rail train delivering CWR (each piece is 1,600-ft in length). Installation of the rail and ties will be utilizing contractor forces with specialized equipment not owned by IAIS. Upon completion of the rail and tie installation, IAIS forces will place ballast and surface the reconstructed track, leaving a smooth and uniform profile.

The completion of the work will end with IAIS performing diligent housekeeping and dressing of the project to leave a clean finished track through the project area.

The project will take approximately 6 months to complete upon delivery of rail.

Project Criteria

The project meets the required criteria spelled out in the Notice of Funding Availability

- The project is on a route carrying manifest and unit trains containing tank cars of ethanol. Approximately one half of the ethanol traffic is in the form of unit trains.
- Need for rehabilitation to upgrade infrastructure to support the shipment of ethanol to increase rail safety and public benefits detailed elsewhere in this application
- The estimated cost of the project is $2,987,574

- IAIS will provide a 20% contribution to the project in the amount of $597,515
- No funds have been expended on this project to date.
- The project will rehabilitate, restore and improve track conditions that directly and positively impact rail safety through track renewal, ballast renewal, turnout replacements, and drainage rehabilitation.

Evaluation Criteria

Technical Merit

The project proposed in this application will improve the infrastructure of this critical ethanol route through Des Moines/West Des Moines and fully meets the requirements outlined in the Notice of Funding Availability.

Figure 5-Crossing at 3rd St. looking east

The rehabilitation of the track segments in the Des Moines/West Des Moines area is relatively straightforward with new track, ties, turnouts, ballast restoration and surfacing. The project will easily achieve the safety improvements and related benefits detailed. Risks of a rail incident due to a track deficiency will be clearly reduced with a newer, more robust track structure.

The tasks as outlined in the SOW are appropriate to achieve the expected safety outputs of the proposed project.

The proposed costs are realistic and are sufficient to accomplish the tasks documented in the Statement of Work.

The Iowa Department of Transportation is confident in IAIS's ability to finance the match and complete the project meeting the requirements of a federal grant. The Iowa DOT has successfully partnered with IAIS on a number of projects and is fully confident in their staff and capabilities to successfully complete this project on time and within budget.

Project Benefits

The current rail infrastructure in the project location consists of 112# jointed rail, most of which is approximately 40 years old. Rail of this size and age is subject to head-web separation defects and internal fractures which are not easily identified in routine track inspections. The route has not been fully rehabilitated the 1980's when the route was purchased from the bankrupt Rock Island Railroad. A full rehabilitation will improve the track bed, track structure, eliminate potentially hidden defects, and improve the track geometry, all of which will reduce the potential of a track caused derailment. Though the risk of any derailment on a particular segment of track is small, the implications of a derailment, release and potential fire could be catastrophic, especially in this particular environment where high density commercial and residential housing are nearby. The added risk to adjacent water resources would be reduced.

This route carries an average of 8,060 rail cars annually through this sensitive area. On average the area sees 6 trains per day at an average length of 7,500 feet. Approximately half of the ethanol traveling through the project area is in unit trains. A single unit train of ethanol represents approximately 2 million gallons of highly flammable liquid in a congested area. The route includes two railroad-under viaducts where high volumes of traffic are routed over the tracks. A potential derailment could and would put a large population in harm's way, potentially damage or destroy major traffic arteries out of the downtown area and create a major congestion issue. Evacuation would be difficult with the population and existing highway infrastructure in the Downtown area in the event of an incident.

Figure 6 -Crossing at SW 9th Street under the viaduct

New rail, ties, and associated rehabilitation will improve track structure and allow an increase in speed to safely transport ethanol at 25 mph through the project area, double the current speed used to assure safety with current track condition. These activities will provide these benefits:

- Increased safety in the movement of ethanol through a populated area
- Improved quality of life for downtown commuters by reducing traffic congestion from train movement
- Financial benefits from the reduction in time spent waiting for trains at crossings

The use of continuous welded rail as opposed to the current jointed rail will provide these benefits:

- Increased safety in the movement of ethanol through a populated area
- Improved quality of life in the vicinity of the track through noise reduction
- Increased safety with more reliable signal systems

Completion of the rehabilitation project will provide these environmental benefits:

- Time reduced by idling vehicles at a total of 19 highway-railroad at-grade crossings
- Environmental benefits from reduced locomotive fuel usage
- Environmental protection of recreational water features

Completion of the proposed project will benefit the many highway users, residents, and commercial building workers by creation of a modern, more robust rail line that is better suited for the transport of large quantities of a highly flammable substance. IAIS will benefit with a lower liability and potential for infrastructure damage due to a derailment.

Benefit Cost

Benefit Cost can be evaluated in two ways – qualitatively and quantitative. For this particular project, the benefits are positive in both respects.

The largest and most important qualitative benefit is the increased safety derived from the reduced risk of a track-caused derailment or incident. The department has identified no quantifiable method to represent that benefit. Though the potential for *any* derailment is low, in this sensitive area, the potential impacts are immense due to the location of this route in very close proximity to the downtown area and waterways. The downtown area is the home of commercial development (including major company headquarters), government buildings (federal, state & local), public safety and health care providers as well as urban residential development. An incident involving the release and potential fire of ethanol products would endanger a large population, put valuable property at risk, and present a challenge in evacuation of the affected populations.

Quantitatively, an analysis of the value of travel time saved, savings in maintenance costs, and the value of the reduction in PM_{10} and NO_x emissions resulted in a 2.2 benefit to cost ratio, discounted at 7%. Benefits of these quantifiable benefits totaled $6,644,256 compared to a total project cost of $2,987.574.

Un-discounted total benefits over the 20 year period by category are detailed below:

Undiscounted benefit values by category over 20 years	
Total Value of Time Saved	$12,810,391
Additional Maintenance Costs	-$203,753
Value of Emissions Reduction PM_{10}	$209,110
Value of Emissions Reduction NO_x	$125,710.31

Appendix E. includes details on the benefits and costs. In addition an Excel spreadsheet with the assumptions and data used in the benefit cost calculation is included.

Other Selection Criteria

Alignment with DOT Strategic Goals and Priorities

Improving transportation safety -The project will improve transportation safety for both rail traffic, and for motorists impacted by train traffic blocking vehicle traffic in the area. This will be accomplished by:

- An improved track structure with new CWR rail, ties, turnout, and other fasteners
- Decreased wait time for motorists at rail crossings. This will reduce congestion in the area, particularly at the 19 highway-railroad at-grade crossings included in the project (17 in downtown Des Moines and 2 in West Des Moines) and other intersections near these crossings.

Maintaining infrastructure in a state of good repair -As a result of this project, rail infrastructure will be renewed. While some maintenance has been done to this section of track in the past, it has not had a total reconstruction for approximately 40 years. This project will allow the track to have a useful life of another 40 years, with the only future work being necessary being occasional tie replacement.

Figure 7 – Worn ties are apparent in this photo at 5th St. looking west

Promoting economic competitiveness -The downtown area of Des Moines will benefit from this project. After the project is complete, the impact of train traffic on the downtown area will be reduced. Reduced impact and risks from this corridor will help spur continued growth in the area.

Advancing environmentally sustainable transportation policies -By reducing congestion at rail crossings, the idle time of vehicles will be reduced, resulting in a reduction of fuel consumed, and a reduction in the production of greenhouse gases and other pollutants.

In addition, increasing train speed through the area from 10 mph to 25 mph will nearly cut the fuel consumed in rail operations by half. This is due to the fact that grades through the area are relatively flat, and an increase in speed from 10 mph to 25 mph can be accomplished with little or no increase in horsepower. However, because run times will be reduced by half, trains will be able to traverse the area with nearly half of the fuel consumed than if speeds continued at 10 mph.

Livability Principles

Completion of this project will further the following Livability Principles developed by the U.S. DOT, Department of Housing and Urban Development and the Environmental Protection Agency

- *Provide more transportation choices* - The rehabilitation of this route to better accommodate ethanol shipments will also benefit the development of a future passenger rail route and provide more transportation choices for the residents of Iowa. The Iowa Department of Transportation, in conjunction with the Illinois DOT has completed a Tier 1 Environmental Impact Assessment for a potential passenger route from Chicago to Council Bluffs-Omaha, passing through Des Moines. The preferred route for this service is on the IAIS route included in this project. Though the Iowa Department of Transportation has no immediate plans to implement this route, Illinois is currently working to expand service from Chicago to the Quad Cities on the Iowa/Illinois border. The planning study determined that the route was both feasible from an engineering perspective and has minimal impacts on the environment. If or when funding becomes available, the Iowa portion of the route will be developed in stages – first to Iowa City and then to the Des Moines area on the route proposed for improvements in Des Moines. A summary of the Chicago to Council Bluffs-Omaha Regional Passenger Rail System Planning Study is attached as Appendix F.
- *Coordinate policies and leverage investment* - Iowa has a large investment in the production of ethanol, producing approximately 25% of the nation's output. As a supplier to the nation, ethanol is highly dependent and reliant on rail shipment. In addition to ethanol, the production process also produces a number of by products and additional industries have been developed to produce coproducts. The ethanol industry requires three primary things to be successful – an agricultural "raw" material such as corn or plant waste, a sufficient water supply, and a healthy and safe rail system to transport the finished ethanol and related products. The rehabilitation of this route will continue to provide a safe and secure route to ship these products from western Iowa to the eastern and southern states. As the U.S. strives for energy independence the ethanol industry is another tool to promote that goal. The rail transport of ethanol in a safe and secure manner is a key component that allows Renewable Fuel Standards to be met. .

Enhancing quality of life –

The Des Moines downtown area is currently undergoing the redevelopment of urban housing and increased commercial development.

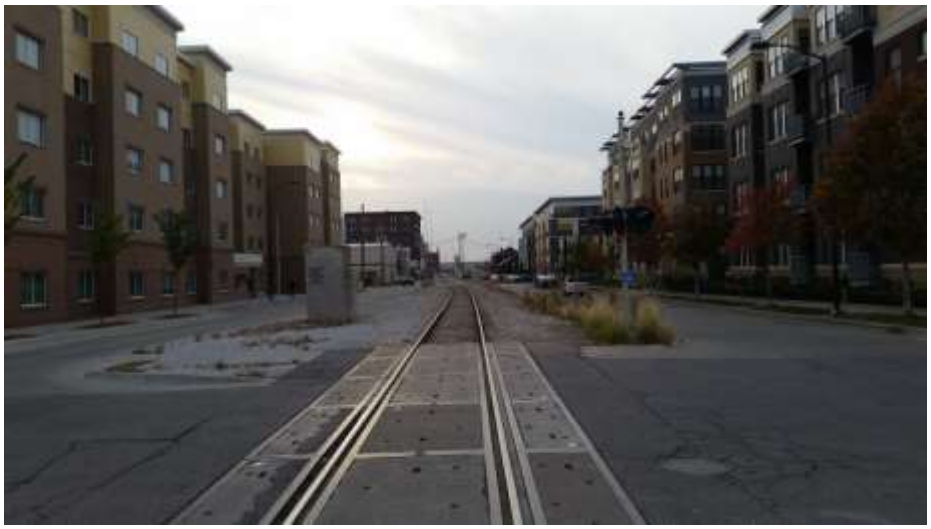


Figure 8 - New urban housing adjacent to IAIS that will benefit from rehabilitation

Completion of this project will have a positive impact on the neighborhood and quality of life. These impacts include:

- The new track structure will have an improved visual effect over that of the existing track structure.
- The new track structure, constructed of CWR, will eliminate rail joints from the track and will reduce the noise from passing trains.
- The new track structure will allow for speeds to be increased from 10 mph to 25 mph, reducing the wait times at 19 highway-railroad at-grade crossings for local traffic, resulting in less "lost" time, traffic congestion, and aggravation.

Creating Economic Development and Job Creation

The ethanol industry in Iowa is dependent on a safe, secure and efficient rail system. Completion of this project will help assure that the Greater Des Moines area's portion of the rail system adequately supports that industry. The ethanol industry in Iowa provides good paying jobs in rural Iowa, in many cases in locations that are disadvantaged areas. The ethanol plants offer a nearby market for corn, increasing the commodity prices for farmers. The ethanol industry builds ladders of opportunity to expand the middle class by providing these job opportunities. These opportunities would not exist without a safe and secure rail system to support the industry.

Project Delivery Performance

The Iowa Department of Transportation will administer this project through a sub-grantee agreement with IAIS. IAIS has successfully managed two previous federal grants under the Railroad Rehabilitation & Repair (Disaster Assistance) program. IAIS understands and is willing to comply with the requirements associated with a federal grant, including NEPA compliance, Buy America, drug-free workplace and other requirements.

Region/Location

The location of the project will neither increase or decrease impact on the general location. The project will take place all within the confines of the current alignment, thus having negligible regional impact. Polk Co. is not an economically distressed area so that there will be little impact to that population.

Completion of this project will help further the FRA's mission to enable the safe, reliable, and efficient movement of people and goods for a strong America, now and in the future. Because the ethanol industry helps meets both state and national goals for sustainable fuels, the completion of this project will more safely and efficiently link businesses with consumers, suppliers, and markets. The project will help meet one of the draft National Rail Plan goals by supporting the current freight rail market share and growth.

The project addresses each of the U. S. DOT's goals to varying degrees for

- Safety
- State of Good Repair
- Economic Competitiveness
- Livable Communities
- Environmental Sustainability

Partnerships

The Iowa Department of Transportation is pleased to partner with IAIS on this project. As Iowa's only Class II railroad, it plays a unique role in filling the gap between the Class I's that provide long distance transport and the shortlines that serve smaller markets.

Project Readiness

A preliminary environmental review was performed to complete the FRA's Categorical Exclusion Worksheet (Appendix G). If awarded a grant, the Iowa DOT's Office of Location and Environment will undertake a more comprehensive review. Any required field studies or more comprehensive reviews will be accomplished by qualified Iowa DOT staff or by a qualified contractor engaged by the sub-grantee. The Iowa DOT's Office of Location & Environment and Office of Rail Transportation have previously worked with the FRA on other projects that require a CE and are fully familiar with FRA's NEPA requirements. Because the project does not vary from the current alignment of an active rail line and based on a preliminary review, the Iowa DOT expects to have additional investigations to complete, but expects the project will not have significant impact on the environment, either individually or cumulatively.

This project is consistent with adopted state and rail plans. Safety is a key element in Iowa's State Transportation Plan updated in 2012. "Safely moving people and goods through investments that strengthen our economic vitality" is a guiding principle for state investments. The plan identifies "Improve the rail system physical infrastructure" and "Monitor rail safety and security conditions" as investment actions.

The Iowa DOT is currently in the process of updating Iowa's 2009 Rail Plan, which is expected to have a greater emphasis on the safe transportation of hazardous materials. The Iowa DOT currently has a Crude Oil and Biofuels Safety report underway which is expected to result in practical, actionable improvements to reduce risk and improve emergency response, such as targeted infrastructure investments that would reduce the risk of derailments, or improved training for first responders. The results of this study will be incorporated in the updated 2016 Iowa Rail Plan.

The proposed project in this application will use the existing alignment and is a straightforward rehabilitation that requires little or no engineering, will not involve significant grading, or any other work that requires special expertise. The project will be able to advance to materials acquisition as soon as a sub-grantee agreement is signed. Once the NEPA Categorical Exclusion is cleared, construction can be scheduled to begin. The project is "near shovel ready."

The proposed project will be advanced with the matching contribution provided from IAIS's capital budget. The proposed project is not dependent on other non-FRA financial contributions and the matching funds will be available in capital reserves. As a rehabilitation using the existing alignment, engineering plans are not needed for the proposed project's design. With no unusual components to the rehabilitation, there are few constructability risks other than that imposed by inclement weather.

Passenger Rail Impact

As detailed previously, this route is identified as a future passenger rail route. Any rehabilitation at this time will only reduce future costs and infrastructure needs if or when funding becomes available to expand passenger rail within Iowa.

Project Implementation

The Iowa DOT will be solely responsible to the FRA for this project if awarded a grant. The Iowa DOT will develop a sub-grantee agreement with IAIS. The sub-grantee agreement will include the department's expectations for project contracting, project oversight and compliance with all federal requirements associated with a federal grant. The Iowa DOT will coordinate any change-orders of a magnitude that affects the overall project with the FRA. Less significant change orders will be coordinated between the Iowa DOT as the grantee and IAIS as the sub-grantee. IAIS has pledged the matching funds for this

project and will be responsible for any cost overruns. The Iowa DOT in coordination with IAIS will conform to Federal requirements for project progress reporting.

Environmental or historic preservation impacts

Because this project is rehabilitation and will not vary from the current alignment, no environmental or historic preservation impacts are anticipated. Further details were included in the Project Readiness section above.